## Claims

What is claimed is:

[c1] An insert for a drill bit comprising:
a diamond-impregnated body; and
a shearing portion disposed on said body.

[c2] The insert of claim 1, wherein the shearing portion comprises at least one selected from the group consisting of cubic boron nitride, polycrystalline diamond, and thermally stable polycrystalline diamond.

[c3] The insert of claim 1, further comprising a bonding portion disposed between at least a portion of said diamond-impregnated body and said shearing portion.

[c4] The insert of claim 3, wherein said bonding portion comprises tungsten carbide.

[c5] The insert of claim 1, further comprising an outer layer disposed on said diamond-impregnated body.

[c6] The insert of claim 5, wherein said outer layer comprises a tungsten carbide layer.

[c7] The insert of claim 1, wherein said diamond-impregnated body comprises thermally stable polycrystalline diamond.

[c8] The insert of claim 1, wherein said shearing portion is disposed on said diamond-impregnated body post-infiltration.

[c9] The insert of claim 1, wherein said shearing portion forms a leading edge of said insert.

[c10] The insert of claim 1 wherein the shearing portion comprises at least one selected from the group consisting of carbides, borides, nitrides and mixtures thereof.

[c11] The insert of claim 1, further comprising a wear portion disposed on a surface of said diamond-impregnated body.

[c12] The insert of claim 1, wherein said shearing portion further comprises a coating.

[c13] The insert of claim 12, wherein said coating comprises at least one selected from the group consisting of a titanium based coating, a tungsten based coating, and a nickel based coating.

[c14] The insert of claim 1, wherein the diamond-impregnated body comprises coated natural diamond.

[c15] The insert of claim 14, wherein at least a portion of the natural diamond is 1 carat in size.

[c16] A drill bit comprising:
a bit body having at least one blade thereon; and
at least one cutting element disposed on the at least one blade, wherein the at least one cutting element comprises a diamond-impregnated body;
and a shearing portion disposed on said diamond-impregnated body.

[c17] The bit of claim 16, wherein said shearing portion forms a leading edge of the at least one cutting element.

[c18] A drill bit, comprising:
a bit body; and
a plurality of inserts affixed to said bit body, at least one of said plurality of inserts having a diamond-impregnated insert body and a shearing portion disposed on said diamond-impregnated insert body.

[c19] The bit of claim 18, wherein a total exposure of said diamond-impregnated insert body to temperatures above 1000° F is greater than a total exposure of said shearing portion to temperatures above 1000° F.

[c20] The bit of claim 18, wherein at least a portion of said bit body is diamond-impregnated.

[c21] The bit of claim 18, wherein the bit body comprises infiltrated diamond-impregnated tungsten carbide matrix.

[c22] The bit of claim 18, wherein said diamond-impregnated insert body includes thermally stable polycrystalline diamond.

[c23] The bit of claim 18, further comprising a bonding portion disposed between at least a portion of said diamond-impregnated insert body and said shearing portion.

[c24] The bit of claim 23, wherein said bonding portion comprises tungsten carbide.

[c25] The bit of claim 18, further comprising an outer layer disposed on said diamond-impregnated insert body.

[c26] The bit of claim 25, wherein said outer layer comprises a tungsten carbide layer.

[c27] The bit of claim 18, wherein said shearing portion forms a leading edge of said insert.

[c28] The bit of claim 18, further comprising a wear portion disposed on a surface of said diamond-impregnated insert body.

[c29] The bit of claim 18, wherein said shearing portion further comprises a coating.

[c30] The bit of claim 29, wherein said coating comprises at least one selected from the group consisting of a titanium based coating, a tungsten based coating, and a nickel based coating.

[c31] A method for forming a drill bit comprising:

(a) forming a shearing portion on a diamond-impregnated insert body to form a cutting insert;

(b) forming a bit body having a plurality of sockets sized to receive a plurality of the cutting inserts; and

(c) mounting the plurality of cutting inserts in the bit body and affixing the plurality of cutting inserts to the bit body; wherein steps (a)-(c) are carried out such that a total exposure of the diamond-impregnated insert body to temperatures above 1000° F is greater than a total exposure of the shearing portion to temperatures above 1000° F.

[c32] The method of claim 31, wherein at least a portion of said bit body is diamond impregnated.

[c33] The method of claim 31, wherein step (c) includes affixing the plurality of cutting inserts to the bit body by at least one method selected from the group consisting of brazing, affixing by an adhesive, and affixing by a mechanical means.

[c34] A method of forming a diamond-impregnated insert having a shearing portion, comprising:

forming a diamond impregnated insert body; and

bonding the shearing portion to the diamond-impregnated insert body to form the diamond-impregnated insert.

[c35] The method of claim 34, wherein the forming the diamond-impregnated insert body is accomplished by a hot press process.

[c36] The method of claim 35, wherein the hot press process is performed with a powder material in a mold, the powder material being selected to form the diamond-impregnated insert body.

[c37] The method of claim 36, wherein the bonding the shearing portion and the forming the diamond-impregnated insert body are accomplished substantially at a same time in a hot press process.

[c38] The method of claim 37, wherein the shearing portion is attached to an upper plunger, prior to bonding the shearing portion to the diamond-impregnated insert body.

[c39] The method of claim 34, wherein the forming the diamond-impregnated insert body is accomplished by a high pressure, high temperature process.

[c40] A method of drilling a mixed formation comprising:

contacting a bit with the mixed formation, wherein the bit comprises a bit body; and

a plurality of inserts affixed to said bit body, at least one of said inserts having a diamond impregnated insert body and a shearing portion disposed on said body.

[c41] A composite cutting element for a drill bit comprising:

an abrasive body having a mixture of ultra-hard material and a less abrasion resistant matrix material cemented together; and

a shearing element on said body.

[c42] The composite cutting element of claim 41 wherein the relative abrasion resistance of the ultra-hard material and the matrix material vary depending on the formation compressive strength and abrasivity and also on the size of the ultra-hard material

[c43] The composite cutting element of claim 41 wherein the ultra-hard materials comprises at least one selected from the group consisting of diamond crystals, cubic boron nitride crystals, polycrystalline diamond or polycrystalline cubic nitride crystals.

[c44] The composite cutting element of claim 41 wherein the matrix material consists of carbides, nitrides, borides or mixtures thereof.

[c45] The composite cutting element of claim 41 wherein the ultra hard material is diamond crystals and the matrix material is CBN crystals cemented with at least one compound selected from the group consisting of carbides, borides, and nitrides.

[c46] The composite cutting element of claim 41 wherein the diamond concentration and diamond particle size in the abrasive body and the shearing element depends on the abrasivity and compressive strength of the formation being drilled.

[c47] The composite cutting element of claim 46, wherein the diamond concentration in the abrasive body is selectively varied.